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THE POTENTIAL ROLE OF THREE *TRIS* (3-HYDROXY-4-PYRIDINONATE) IRON(III) COMPLEXES ON IRON DEFICIENCY CHLOROSIS PREVENTION

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Iron (Fe) is an essential nutrient for plants and legumes are major sources of Fe in human and animal diets. However, the absorption of Fe by plant roots is compromised when grown in alkaline soils, which correspond to 30% of the world's arable land. As a consequence, plants suffer from Fe deficiency chlorosis (IDC), characterized by chlorosis, yield losses, and lower concentrations of Fe in edible plant parts. Soil application of synthetic Fe(III) chelates remains one of the most common measures to correct IDC.

We compared the potential of three *tris*(3-hydroxy-4-pyridinonate) Fe(III) complexes [$Fe(mpp)_3$], [$Fe(dmpp)_3$] and [$Fe(etpp)_3$], to amend IDC in hydroponically grown soybean (*Glycine max*) plants.

The application of all Fe complexes improved plants condition when compared to those grown with no added Fe treatment. Moreover, plants treated with [$Fe(mpp)_3$] exhibited the best overall results. Plants treated with [$Fe(mpp)_3$] presented: (a) higher chlorophyll content, with 18% and 13% significantly higher SPAD values when compared to [$Fe(dmpp)_3$] and [$Fe(etpp)_3$] respectively; (b) higher biomass development, with 16% and 6% greater shoot and root dry weight in [$Fe(mpp)_3$], when compared to [$Fe(dmpp)_3$] and [$Fe(etpp)_3$] treated plants; and (c) higher Fe accumulation, with 6% and 11% greater total Fe content when compared to [$Fe(dmpp)_3$] and [$Fe(etpp)_3$].

Stress condition of plants was further evaluated by measuring root reductase activity at the end of the assay. Plants treated with [$Fe(etpp)_3$], showed the highest reductase activity levels, whilst those treated with [$Fe(mpp)_3$] and [$Fe(dmpp)_3$] exhibit lower values. This result was confirmed by the gene expression analysis of the *FRO2*-like gene.

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